REMARKS

The office action of 09-10-2004 has been reviewed and its contents carefully noted. Reconsideration of this case, as amended, is requested. Claims 1-11 remain in this case.

Claim Objections

Claims 3, 7-9 are objected to because of the following informalities.

Applicant thanks the Examiner for pointing out the following: In claims 3, 7-9 "VCT:, "CTA", "TA" "OPA" should be spelled out. VCT, "CTA", "TA", and "OPA" has been spelled out respectively. Reconsideration and withdrawal of the objections are respectfully requested.

Rejection(s) under 35 U.S.C. §102

Claims 1-9 were rejected under 35 U.S.C. 102(b) as being anticipated by Kouketsu et al. (PN 6,412,356). Hereinafter referred to as Kouketsu. Applicant respectfully disagrees with the rejection.

The Office Action states, in part:

> Regarding claim 1 Kouketsu discloses providing a cam sensor wheel (See Figure 1 (3)) having a plurality of teeth including **an index** (See Figure 1 (5)) tooth formed upon the circumference of the *cam sensor wheel*; providing a sequence of pulses (See Abstract, Column 5 Lines 65-67, Column 6 Lines 1-16) **corresponding to the plurality of teeth;** and using one tooth among the plurality of teeth for identifying the **direction** of cam torque (See Abstract, Column 5 Lines 65-67, Column 6 Lines 1-16). (emphasis added)

Kouketsu teaches a **magnetostrictive** torque sensor that has a **magnetostrictive** member fixed to a shaft. The magnetostrictive member is *strained* by the **torque** applied to the shaft. Exciting coils generate flux running through the magnetostrictive member. The flux varies in accordance with the strain of the magnetostrictive member. Detecting coils detect the flux variation. The exciting coils and the detecting coils are wound about bobbins. A stator supports **the bobbins** such that the coils surround and face the magnetostrictive member. The stator is

rotatably supported relative to the shaft and is formed with stator pieces. The stator has annular grooves formed in its inner surface to accommodate **the bobbins**. One end of each bobbin is fixed to one wall of the corresponding **annular groove**. A clearance is formed between the outer end of the bobbin and the other wall of the **annular groove**, and another clearance is formed between the outer circumferential surface of the bobbin and the inner circumferential wall of the **annular groove.** The clearances accommodate thermal expansion of the bobbins, which improves the performance of the torque sensor.

Claim 1 recites:

1. (Original) In a VCT system, a method for identifying a direction of cam torque, the method comprising the steps of:

providing a **cam sensor wheel** having **a plurality of teeth** including **an index tooth** formed upon **the circumference** of the cam sensor wheel;

providing **a sequence of pulses** corresponding to the plurality of teeth; and

using one tooth among the plurality of teeth for identifying **the direction of cam torque**. (emphasis added)

It is noted the Examiner is mistaking in pointing out that numeral 5 of Kouketsu is an index tooth. In fact, numeral 5 is NOT a tooth, more specifically Not an index tooth. In fact nowhere in Kouketsu is an index tooth disclosed or taught. Further, Kouketsu does NOT teach a "providing a **cam sensor wheel** having **a plurality of teeth** including **an index tooth** formed upon **the circumference** of the cam sensor wheel". The relevant language of Koukstsu is listed below for the benefit of the Examiner.

> The detection member 3 is welded to the shaft 2 and includes a cylindrical **magnetostrictive member 5**, sleeves 5b adjacent to the member 5 and threaded portions 5c formed at the ends. The magnetostrictive member 5 has a magnetostrictive property. The magnetostrictive member 5 can be made of a soft magnetic material having a high magnetic permeability such as permalloy and iron-nickel-chromium alloy. The magnetostrictive member 5 also can be made of magnetostrictive material including iron and aluminum or an amorphous magnetostrictive material. The

magnetostrictive member 5 includes **two regions** X and Y, in which grooves 5a are formed. The grooves 5a are equally spaced apart in the circumferential direction. The grooves 5a in one of the regions X are inclined by **forty-five degrees** relative to the axis, and the grooves 5a in the other region Y are inclined by **minus** forty-five degrees relative to the axis. The bearings 6 are press fitted between the sleeves 5b and the detector 4.

Further, the Office Action states that in "Column 5 Lines 65-67, Column 6 Lines 1-16" the teachings of the present invention are disclosed. Applicant respectfully disagrees and submit that no **pulse wheel** or **a sequence of pulses** are disclosed in Kouketsu. Kouketsu merely teaches a *rectified voltage value* on the coil for determining the direction and intensity of a torque. The relevant language is listed below for the convenience of the Examiner.

> The processor includes a differential circuit, a rectifier circuit and a torque computing circuit (none of which is shown). The processor receives voltages from the detecting coils 10, 11. The differential circuit computes the difference between the voltages. The rectifier circuit rectifies the computed difference and outputs the rectified signal to the torque computing circuit. The torque detector circuit computes the magnitude and the direction of the torque based on the value and the sign of the rectified signal. In this manner, the processor **detects an applied torque** based on **voltages** from the detecting coils 10, 11. The computation of the difference performed by the differential circuit compensates for external noise such as temperature changes. Accordingly, the accuracy of torque detection is improved. The torque computing circuit detects the direction of the torque based on whether the rectified signal has positive value or a negative value relative to a reference value (zero) and also detects **the magnitude** of the torque *based on the magnitude of the rectified signal.* The reference value is set such that it becomes zero when no torque acts on the shaft 2.

Therefore, it is respectfully suggested that the rejection of independent claim 1 as being anticipated by Kouketsu is overcome. Dependent claims 2-11, being dependent upon and further limiting independent claim 1, should also be allowable for that reason, as well as for the additional recitations they contain. Reconsideration and withdrawal of the rejection are respectfully requested.

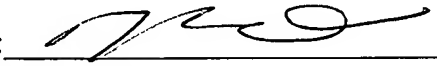
Conclusion

Applicant believes the claims, as amended, are patentable over the prior art, and that this case is now in condition for allowance of all claims therein. Such action is thus respectfully requested. If the Examiner disagrees, or believes for any other reason that direct contact with

Applicants' attorney would advance the prosecution of the case to finality, he is invited to telephone the undersigned at the number given below.

"Recognizing that Internet communications are not secured, I hereby authorize the PTO to communicate with me concerning any subject matter of this application by electronic mail. I understand that a copy of these communications will be made of record in the application file."

Respectfully Submitted:
Zhenyu Jiang

By: 

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